ZOE

VOL. 5 MAY, 1903. No. 9

EDITOR, - - KATHARINE BRANDEGEE.

CONTENTS:

Flora of the Providence Mountains. T. S. BRANDEGEE 147
Vegetation of the Colorado Desert: T. S. BRANDEGEE 153
Notes and New Species of Lower California Plants: T. S. BRANDEGEE . 155
Notes on Papaveraceæ: T. S. BRANDEGEE 174
Recent Literature 178

ZOE PUBLISHING COMPANY

CORNER FIRST AND REDWOOD STS.

SAN DIEGO, CALIFORNIA.

ZOE

A JOURNAL OF BIOLOGY.

Subscription for United States, Canada and Mexico, $2.00 per year in advance; single numbers, 20 cents.

Other countries in Postal Union, $2.25 per year.

Vol. i, ii, iii, iv, about 400 pages each, with 33 plates, numerous new species, and many important papers indispensable to the student of West American botany, $2.00 each.

Vol, I will not be sold separately, but a few of the numbers can be had singly.

ZOE PUPLISHING COMPANY

Cor. First and Redwood Sts.

SAN DIEGO, CALIFORNIA.

ZOE

VOL. V. MAY, 1903. No. 9.

FLORA OF THE PROVIDENCE MOUNTAINS.

The Providence Mountains are situated on the Mojave Desert near to its eastern boundary and to Arizona. Usually on maps "Providence Mts." cover a large extent of territory and include several disconnected ranges, but by the few residents of the vicinity the name Providence Mt. is applied to a mountain about twenty miles long, less than ten miles wide and 7000 ft. elevation above sea level, lying thirty miles north of the station of Fenner on the Atlantic and Pacific Railway. The surrounding country from the high peaks of this mountain looks like an ocean studded with many islands, large and small, the dry sandy plain of the Mojave representing the water, and the mountains standing ten, twenty or thirty miles apart, the islands. Providence Mountain is one of the largest of the Eastern Mojave region. It is very rough and rocky; much of the rock being a form of limestone in which rich silver mines have been found.

The average rainfall must be low and my collection was made at a time following an unusually small precipitation of the previous summer and winter. Not an annual was seen along the railway between Bagdad and The Needles, and only a few appeared in the cañons of the mountains. The especial interest attached to the collection from this locality is the expected numerous additions to the Flora of California of plants whose habitat is Arizona and Southern Utah. Very few botanists have brought plants from this region and the small number noticed in various publications were collected by Dr. J. G. Cooper and Edward Palmer.

The mountain is difficult to explore on account of the scarcity of water, and it was necessary to work from dry camps. The

higher altitudes are well supplied with *Pinus monophylla* and there is a considerable amount of *Juniperus Utahensis;* the only other shrubby vegetation of any size worthy of note is *Quercus chrysolepis*, some *Garrya flavescens* and an abundance of *Rhus aromatica trilobata.*

The following list of the plants collected is not complete, many of those of wide distribution having been omitted:

Delphinium scaposum Greene.

Eschscholtzia minutiflora Watson.

Arabis perennans Watson.

Arabis Holboellii Fendleri Watson.

Caulanthus crassicaulis glaber Jones.

Stanleya pinnatifida Nutt.

Sisymbrium diffusum Gray.

Lesquerella Utahensis Rydberg.

Lepidium Fremonti Watson. This species is represented by two forms: one with orbicular pods and sparingly-lobed leaves, the other with rhombic pods, cuneate at base, and leaves much lobed.

Silene montana Watson.

Arenaria Fendleri Gray. Flowers light yellow.

Sphæralcea ambigua Gray.

Linum Lewisii Pursh.

Larrea Mexicana Moric.

Rhamnus Californica tomentella Brewer and Watson.

Rhamnus crocea Nutt. Very abundant.

Rhus aromatica trilobata Gray.

Hosackia sp. belonging to the *H. Wrightii* group and by its characters most nearly related to *H. Neo-Mexicana.*

Lotus argensis Coville. This species is also common in cañons of the eastern side of the mountains of San Diego County where it is known as *Hosackia rigida.*

Petalostemon Searlsæ Gray.

Astragalus Mojavensis Watson.

Astragalus eriocarpus Watson.

Astragalus playanus Jones.

Cassia armata Watson.

Acacia Greggii Gray.
Prunus fasciculata Gray. Very abundant.
Luetkea cæspitosa (Nutt).
Holodiscus discolor (Pursh).
Coleogyne ramosissima Torr.
Cercocarpus intricatus Watson. Leaves narrow and very pubescent.
Cowania Mexicana Don. Flowers white or cream color.
Cowania Mexicana var. **dubia**. Stamens much less in number than in the typical species; carpels two or three; tails of the fruit short, not plumose but covered with short, dense, spreading, bristle-like hairs. This form was also collected by Dr. C. A. Purpus on Morey Peak, Nevada, in 1898, and he considered it a hybrid between Cowania and Purshia. Prof. A. M. Jones informs me he has noticed it, and supposed it to be a depauperate form of *Cowania Mexicana*. It needs study in the field to arrive at its true botanical status.
Fallugia paradoxa Endl.
Amelanchier alnifolia Nutt.
Heuchera rubescens Torr.
Cotyledon sp.
Œnothera chamenerioides Torr.
Œnothera cæspitosa Nutt.
Gaura coccinea Nutt. The specimens are without fruit but are evidently perennial.
Mentzelia albicaulis Dougl.
Mentzelia lævis T. & G.
Echinocactus cylindraceus Engelm.
Cereus Engelmanni Parry.
Cereus Mojavensis Engelm.
Opuntia chlorotica Engelm. & Big.
Opuntia rutila Nutt.
Cynomarathrum Parryi C. & R.
Garrya Veatchii flavescens C. & E.
Symphoricarpos longiflorus Gray.
Galium Aparine L.
Galium angustifolium Nutt. Too young.

Galium stellatum Kellogg.
Galium multiflorum Watsoni Gray.
Brickellia microphylla scabra (Greene).
Brickellia linifolia D. C. Eaton.
Brickellia atractyloides Gray.
Brickellia incana Gray.
Gutierrezia sp. Nearly the same as *G. Californica.*
Aplopappus cuneatus Gray.
Aplopappus gracilis Gray.
Aplopappus monactis Gray. Not typical but tending toward *A. laricifolius.*
Aplopappus linearifolius DC.
Bigelovia Cooperi Gray. The specimens are very young.
Solidago pumila T. & G.
Aster tortifolius Gray.
Aster ericæfolius Rothrock.
Aster (*Machæranthera*) *canescens* Pursh.
Erigeron filifolius Nutt.
Erigeron concinnus T. & G.
Baccharis sergiloides Gray.
Gnaphalium Wrightii Gray.
Franseria eriocentra Gray.
Viguiera deltoidea Parishii (Greene).
Encelia frutescens Gray.
Riddellia Cooperi Gray.
Baileya multiradiata Harv. & Gray.
Hymenopappus filifolius luteus (Nutt).
Dysodia Cooperi Gray.
Porophyllum gracile Benth.
Tetradymia stenolepis Greene.
Senecio Douglasii D. C.
Senecio multilobatus T. & G.
Actinella biennis Gray.
Fraxinus anomala T. & G.
Asclepiodora decumbens Gray.
Frasera albomarginata Watson.
Phlox longifolia Stansburyi Gray.

Gilia inconspicua Dougl.

Gilia pungens Hookeri (Dougl.) Flowers varying in color from yellowish to decidedly yellow.

Gilia aggregata Bridgesii Gray. "Apparently perennial."

Gilia floccosa Gray.

Ellisia Torreyi Gray.

Phacelia rotundifolia Torr.

Phacelia pedicellata Gray.

Phacelia campanularia Gray.

Phacelia hispida Gray.

Krynitzkia humilis (Gray).

Physalis crassifolia Benth.

Physalis Fendleri cordifolia Gray.

Physalis Palmeri Gray. Reduced to *P. hederæfolia* by Dr. P. A. Rydberg.

Nicotiana trigonophylla Dunal.

Antirrhinum maurandioides Gray.

Pentstemon Eatoni Gray.

Pentstemon Palmeri Gray.

Pentstemon antirrhinoides Benth.

Pentstemon Stephensi. Glabrous throughout, 1 m. high, branched from near the base; lower leaves 3–4 cm. long, ovate to orbicular on winged petioles of about the same length. upper ones connate-perfoliate, all saliently, sharply denticulate; thyrsus 2 dm. long, about 50-flowered, bracteate with small connate leaves, peduncles 2-flowered, 1 cm. long and less; corolla 15–20 mm. long, lilac to pink, indistinctly bilabiate, nearly tubular or slightly ampliated at the throat, 4 mm. wide, lobes equal; sterile filament glabrous; anthers explanate; sepals broadly ovate, acute, 4 mm. long, half shorter than the acuminate, immature capsule.

This species has the leaves of *P. Palmeri* and *P. spectabilis* and a corolla approaching in shape that of *P. centranthifolius*. It was found growing in soft earth at the base of cliffs about the Providence Mts. Named for Mr. Frank Stephens, the well-known ornithologist and naturalist, whose kindness enabled me to collect in this region.

Pentstemon calcareus. Woody at base, cæspitose; stems 5–10 cm. high, finely pubescent; basal leaves, thick in texture, 2–4 cm. long, 15 mm. wide, variable in shape, ovate to elliptical, cuneate into a winged petiole, rarely with a few denticulations, stem leaves 2–3 cm. long, linear lanceolate, upper ones sessile; inflorescence of 8–10 flowers crowded at end of the stem, in fruit the thyrsus becoming 3–4 cm. long; corolla pink, 12 mm. long, tubular funnel form, lobes short and nearly equal; sterile filament densely yellow-bearded upon one side; sepals 4 mm. long, lanceolate, pubescent, somewhat viscid, longer than the acuminate capsule.

In appearance resembling *P. Harbourii*, to which it is nearly related. It grows upon the face of perpendicular limestone cliffs of Providence Mt. Dr. Purpus collected insufficient specimens of what appears to be the same plant in Southern Utah.

Mimulus luteus L.

Castilleia angustifolia Nutt.

Monardella linoides Gray.

Audibertia incana Benth.

Audibertia capitata Gray.

Salazaria Mexicana Torr.

Hedeoma thymoides Gray.

Verbena ciliata Benth.

Lippia Wrightii Gray.

Mirabilis multiflora Gray.

Mirabilis aspera Greene. This species has been distributed by Mr. Parish as *M. Californica deserti.* It seems more distinct in the Providence Mts. than on the mountains bordering the Colorado Desert, where the flowers are often quite purple.

Oxybaphus nyctagineus Sweet? Plants 4 inches high, densely glandular-pubescent, leaves hastate. Nearly glabrous specimens were also collected. Purpus, No. 5905, from Nevada, represents a still more glabrous form.

Pterostegia drymarioides F. & M.

Chorizanthe Watsoni T. & G.

Eriogonum nidularium Coville.

Eriogonum Watsoni T. & G.

Eriogonum angulosum Benth.
Eriogonum Palmeri Watson.
Eriogonum fasciculatum polifolium (Benth).
Eriogonum phyllanthum Benth.
Eriogonum inflatum Torr.
Eurotia lanata Moq.
Grayia polygaloides H. & A.
Euphorbia schizoloba Engelm.
Euphorbia albomarginata T. & G.
Quercus chrysolepis Liebm.
Arceuthobium divaricatum Engelm.
Ephedra Nevadensis Watson.
Pinus monophylla Torr. & Fremont.
Juniperus Californica Utahensis Engelm.
Calochortus Nuttallii T. & G.
Yucca Mohavensis Sargent.
Agave sp.
Pellæa Wrightiana Hook.
Cheilanthes Fendleri Hook.
Notholæna Parryi Eaton.
Notholæna Newberryi Eaton.
Notholæna tenera Gillies.
Stipa coronata Thurber.
Melica frutescens Scribner.
Sitanion sp.
Poa, two species.

NOTES ON THE VEGETATION OF THE COLORADO DESERT.

BY T. S. BRANDEGEE.

The Colorado Desert is a name given to an extent of land situated between the eastern base of the mountains of San Diego and San Bernardino Counties and the Colorado River. On the north it merges into the Mojave Desert, without any well-defined dividing line, and on the south extends a short distance into Lower

California. At various localities, especially near the foothills of the mountains, there are high, rocky ridges that stand well out on the desert proper, unconnected with the higher main range. A large area of the flat portion is below the level of the sea and at one time was an inland lake into which the waters of the Colorado River emptied.

Shells of species said to be now living in that river are scattered thickly over the ground in many places below the old beach line, that is even now well marked. Below this old beach line there is a scanty flora and it nearly all seems to have been brought in by the waters of the Colorado. The flora growing on the surrounding higher lands stops at the beach line, excepting where a gulch or dry stream bed has allowed the rains to carry seeds on to the lower levels. The channels through which the Colorado at high water runs into the Salton Basin are lined with species of shrubby Atriplex and Baccharis, and over the level portion grow many chenopods, especially Monolepis. There are numerous small annual Eriogonums, some *Sphæralcea Coulteri* and other Arizona plants. Around the lakes, shallow depressions filled with Colorado River water, is a band of vegetation, the outermost mainly Prosopis, and that near the muddy edges consisting mostly of *Nama stenocarpum* and *Aster spinosus*. Later in the season, after an abundant overflow from the channels, great quantities of *Atriplex Palmeri* appear and grow to a height of ten feet in some places and *Sesbania macrocarpa* is plentiful. The Cactaceæ, so abundant in the surrounding regions, do not appear below the beach line, and I have not seen a single one on the old lake bed. Some plants, such as Larrea, are as common on the slightly elevated parts and sand drifts as they are above the beach line, but they grow also along the Colorado River. The name Colorado Desert does not seem appropriate to much of this region now, for the water of the Colorado is irrigating a large extent of it, and in a short time there will be many accessions to its flora from seeds brought in by the gardener and agriculturist.

Some additions to the Flora of California from the vicinity of this region are worthy of note. *Ammobroma Sonoræ* was collected by Alfred Stockton near the Colorado River, *Malperia*

tenuis grows on the boundary line near Signal Mt., *Gonolobus parvifolius* comes from Ironwood Well; and

CALYCOSERIS WRIGHTII Gray, var. **Californica.** Flowers white, becoming purplish in age; akenes more slender, with longer beak and sharper angles than are those of the type as described by Dr. Gray.

In sand, near San Felipe, growing with *C. Parryi.* The glands of the latter are black, but are pale in the variety and probably also in the type of *C. Wrightii.*

NOTES AND NEW SPECIES OF LOWER CALIFORNIA PLANTS.

BY T. S. BRANDEGEE.

In 1902 I went to San Josè del Cabo to collect botanical specimens, and explored many localities of the Cape Region not visited by me during previous trips. Just before this trip there had been abundant rains and a severe drought of several years duration had come to an end. The severity of this drought can be realized by the fact that on Sierra El Taste I saw oak trees that must have been more than a hundred years old dead from its effects. The middle elevations seemed to have suffered more from the lack of the usual rains than the lower, probably because their vegetation is not so accustomed to a small rainfall. At the time of this last visit the annuals were more luxuriant than I had ever before seen them, having grown rapidly from seed that must have lain dormant several years. The trees and bushes had not fully recovered from the long drought and many of them did not come into flower.

Dr. C. A. Purpus in 1901 made a visit of several months to the Cape Region, collecting Cacti and as many plants as it was possible to find during the existence of the drought. His collection was made at a different season of the year from that of my visits to the country, and consequently many interesting plants were added to the flora. The study of the collections has made it necessary to work over the material gathered in previous years, and previous mistakes have been corrected as much as possible.

I am under obligations to Dr. B. L. Robinson and Dr. J. M. Greenmann for their assistance in connection with many of the species and for comparisons made with types in the Gray Herbarium, and also to Dr. J. N. Rose for comparisons with plants of the National Herbarium.

Cardamine crenata. *Sisymbrium crenatum* Brandg. Proc. Cal. Acad. Ser. 2. III, 111. Plants collected by Dr. Purpus show that it differs from *C. Palmeri* in having the lower leaves slightly pubescent, thinner in texture, ovate, cordate, acuminate, entire or slightly crenate-dentate; a much shorter pod and white flowers. The type specimen lacked the lower leaves and mature fruit. No. 403, 458, *Purpus.*

Sphæralcea Margaritæ. Annual, 6 dm. high, sparingly stellate pubescent; leaves from round-subcordate to deltoid, obtuse or acuminate, sometimes 3-lobed, crenate or serrate, the larger 4 cm. long, 2–3 cm. wide, on petioles of the same length; inflorescence axillary and racemose at the upper part of the stem; corolla 1–2 cm. wide, orange-scarlet; carpels 15–20, 1-ovuled, the scarious apex incurved so as to nearly meet the basal part, the thin scarious sides reticulated.

This species is nearly related to *S. Californica* Rose, and *S. Coulteri* Gray, from which it is easily separated by its axillary racemes two or three times longer than the leaves, which are of thinner texture, the scarious beaks of the carpels also more closely approach the basal part. *S. Californica* was collected by me in 1902 in the Sierra de la Trinidad of the Cape Region, and in previous years at Soledad, San Jorge and La Paz. Dr. Rose described it from specimens collected by Dr. Palmer at La Paz, and it is, as he writes, biennial or perennial.

S. Margaritæ is a small annual growing on Santa Margarita Island of Magdalena Bay. Collected March 5, 1889.

Abutilon fragile. Stems usually solitary, 1 m. high, branched from the upper axils, hirsute-pubescent; leaves cordate, broadly ovate, long acuminate, crenate-serrate, sparingly stellate-pubescent below, nearly glabrous above; larger ones 10–12 cm. wide, 12–14 cm. long, on petioles 10–14 cm. long; flowers 2–5 cm. wide, solitary in the axils, on peduncles 5 cm. long that are jointed near

the calyx; calyx pubescent, angular, divided more than half way to the base, the acuminate lobes nearly equalling the beaks of the pubescent carpels; seeds smooth and glabrous.

Abundant about the Sierra de la Trinidad of the Cape Region of Baja California. The fruit in my specimens breaks early from the peduncle at the joint. The pubescence of the beaks of the carpels is minutely glandular. From its description, the species seems nearly related to *A. membranaceum* Baker f.

Lonchocarpus littoralis. A spreading bush 2 m. high, branches pubescent; leaflets two pairs and a terminal one, pubescent especially below and when young, broadly ovate, acute, obtuse or rarely retuse, mucronate with the excurrent midrib, 6 cm. wide, 9 cm. long, or less, on petiolules 4 mm. long; flowers in 1 dm. long racemes, purple or sometimes white; calyx pubescent, 7 mm. long, the lanceolate lobes as long as the tube and the two superior connate nearly to their tips; vexillum orbicular, 1 cm. in diameter equalling the wings; stamens in two sets of unequal lengths; ovary pubescent, sessile, about 4-ovuled; pod 6–7 cm. long, 1.5 cm. wide, pubescent, coriaceous, compressed, pointed, attenuate at base, 2–3 mm. thick along the sutures that are somewhat sulcate, especially the dorsal one, indehiscent, slightly constricted between the seeds.

Growing near the coast of the Cape Region. This plant does not exactly agree with all the characters of Lonchocarpus, but the differences are so slight that it seems best to describe it in that genus. The only generic variation is in the calyx, which, instead of being truncate, with very short or obsolete teeth, is divided half its length into lanceolate lobes.

Desmodium Tastense. Annual, stems simple, cylindrical, not striate, 1–1.5 dm. high, uncinate-pubescent; leaves usually unifoliate, on pubescent petioles 5–7 mm. long, ovate-acuminate, slightly mucronate, 1.8 cm. long, 1 cm. wide, chartaceous, strongly reticulate, ciliate, green upon both faces, nearly glabrous above, slightly pubescent below; stipules 1 mm. wide at base, 4–5 mm. long, lanceolate, acuminate, brown, striate, deciduous; inflorescence in small terminal and often axillary few flowered racemes; pedicels 12 mm. long; calyx slightly pubescent, 5-toothed; co-

rolla ochroleucous, the keel the most prominent; bractlets deciduous; pod somewhat twisted, of 4–5 rhomboidal, glabrous, reticulated joints.

Among more than a dozen specimens only three bear each a single trifoliate leaf. At maturity the pod soon falls to pieces, leaving a single joint attached to the pedicel. None of the specimens bear a dozen flowers.

Collected on Sierra El Taste, Nov., 1902.

Phaseolus rubescens. Annual, stems twining, 2 m. and less high, retrorsely hispid-pubescent; petioles 2–5 cm. long, pubescent; leaflets 3, broadly oval, entire, obtuse or mucronate, pubescent especially beneath, 3 cm. wide, 4 cm. long, the lateral ones oblique and sessile, stipules lanceolate, 5–6 mm. long; stipels 1 mm. long; racemes 1.5–3 dm. long, floriferous along the upper third, pubescent and retrorsely hispid; bracts linear-lanceolate, 4 mm. long; pedicels single or in pairs 1 mm. long; living flowers brick-red, when dried wings violet and banner greenish; calyx 3–4 mm. long, 5-toothed, vexillum 8–9 mm. long, 7 mm. broad; legume 6–7 cm. long, 3 mm. wide, slightly falcate, acuminate, pubescent.

The roughness of the stems is not caused by the rather evident long hairs with which they are covered, but by minute bristles. The species is common after a rainy season throughout the lower elevations of the Cape Region.

GALACTIA ACAPULCENSIS Rose is No. 158 of my first collection from the Cape Region.

Erythrina Purpusi. A small tree or large bush, 3–4 m. high, the young branches bearing stout curved spines 5 mm. long; terminal leaflet much the largest, minutely pubescent, 7 cm. long, 8–9 cm. wide, broadly cordate-deltoid, cuneate at base, obtuse or sometimes slightly obtusely pointed, lateral leaflets similar, rachis about 12 cm. long, bearing often 1–2 small spines, petiolules 5 mm. long; banner dark red, 6–7 cm. long, 10–14 mm. wide when unfolded, retuse at apex; wings 15 mm. long, including the long acuminate apex; keel about 18 mm. long; calyx 10–15 mm. long, lanate-pubescent, becoming glabrous, truncate, sometimes obscurely bilabiate, bearing a large gland on the lower lip; ovary

densely pubescent; legume 2–3 dm. long, much constricted between the seeds, stipitate, seeds 15 mm. long, 8–9 mm. wide, scarlet.

It blossoms during the winter months after the leaves have fallen. The species should be compared with *E. lanata* on account of the proximity of their habitats. From that species it is easily distinguished by the larger size of the leaves and fruit, and the leaves are broader than long, rounded instead of "shortly acuminate." The long acumination of the wing of the flower and the retuse banner are also good distinguishing characters. The soft wood is used for making corks.

Common at lower elevations of the Cape Region of Baja California.

Sicyos peninsularis. Stems 5-angled, glandular, 10–12 m. long; leaves membranaceous, short pubescent on both faces, cordate-orbicular in circumscription, 10–12 cm. in diameter, 5-parted to the middle, the lobes triangular acuminate, sharply serrate-dentate; basal sinus 3–5 cm. wide and less in depth, margined along half of its outline by a rib; tendrils 4-fid; raceme of male flowers 15–20 cm. long, much exceeding the leaves, glandular-pubescent, flowers crowded at the end of the 1–2 cm. long branches, 5 mm. wide, on pubescent pedicels 5–8 mm. long, calyx teeth subulate; corolla cream white, glandular; staminеal column 2 mm. long, glabrous; female flowers in a dense head on a peduncle 1–1.5 cm. long, 10–30 flowered; fruit densely setose, cuneate, 10–12 mm. long, 6 mm. wide, setæ 2–3 mm. long.

Common along streams at the base of the Cape Region Mts. In some localities it completely covers the bushes and small trees. It is nearest *S. Deppei*, under which name it is mentioned in Proc. Cal. Acad., Ser. 2, III, 139.

VASEYANTHUS BRANDEGEI (Cogniaux). Dr. J. N. Rose puts *Echinocystis Brandegei* into Vaseyanthus and expresses doubt concerning its distinctness from *V. Rosei**. I have often seen growing plants referred to these species, and there is no difference in their appearance. Considering them as one species, the distribution is along the west coast of Lower California from

*Cont. Nat. Herb. V. 119.

Guadalupe, north of Todos Santos, to Cabo San Lucas and San José del Cabo, and north along the east coast to La Paz and San Juan, and it also has been collected on the Island Espiritu Santo. Vaseyanthus is described as 1-celled, which it usually is, but a fruit from Guadalupe is certainly 2-celled and 2-seeded. The fruit seems to be made up of abortive cells. The fruiting cell is central and symmetrically placed with respect to the shape of the fruit, while the abortive cells and other fruiting cells are irregular in their position. A plant from the eastern coast like the others with fruit usually 1-seeded bore also fruit having sometimes five seeds; the beak is 2-celled and rarely 2-seeded.

Houstonia peninsularis. A suffrutescent plant, the terete stems 10–30 cm. high, erect, grayish, short-pubescent throughout; leaves opposite, in threes or fours, 15–20 mm. long, narrowly linear, acuminate, margins revolute; stipules very small, filiform or deltoid-acuminate; inflorescence cymose on peduncles 1 mm. long or less, pedicels 2 mm. long; calyx lobes 1.5 mm. long, linear-lanceolate; corolla purple, tube 7 mm. long, very narrowly funnel-form, slightly dilated below the spreading lobes; capsule subglobose, calyx adnate nearly to the top; seeds crateriform, minutely scrobiculate.

It grows abundantly in the Sierra de la Trinidad of the Cape Region, generally on nearly perpendicular bluffs barren of other vegetation.

HOFMEISTERIA FASCICULATA (Benth.) var. **Grayi.** Leaves cordate-orbicular, obtusely or obscurely lobed, or only crenate, sometimes three cleft.

Rocks near the ocean between San José del Cabo and Cabo San Lucas. No. 208, *Purpus.*

In describing this variety, I have quoted Dr. Gray. Proc. Am. Acad. V. 159. Specimens from Magdalena Bay, the type locality, have much dissected leaves and are sometimes more pubescent than *H. pubescens*, a species not having as distinct a leaf form as this variety. Every locality of the Peninsula seems to produce a variety of leaf, and when the region is well known botanically all will probably be found to intergrade.

Brickellia peninsularis. Frutescent, 1 m. high; stems

straight, terete, striate, more or less hirsute and glandular-pubescent; leaves opposite, excepting sometimes some of the small ones of the inflorescence, cordate or cuneate at base, ovate, obtuse, crenate or crenate-serrate, larger ones 6–7 cm. long and 5–6 cm. wide, atomiferous, hirsute-pubescent above, hirsute below, especially on the veins, lower surface paler; petioles 2–3 cm. long or less, pubescent; inflorescence corymbose on peduncles from the axils of the upper leaves or on small branches; peduncles 4–5 cm. long, glandular hirsute, bractless; involucre 1–1.5 cm. long, campanulate, the inner bracts linear-lanceolate, acuminate, outer bracts ovate-lanceolate, acute, hirsute; flowers in the head 20–30, corolla 10–12 mm. long; akenes 1 cm. long, densely silky-villous.

This plant has been collected by me during every trip made to the Cape Region. and now Dr. Purpus has sent much additional material. It grows from near sea level at San José del Cabo to the summits of the highest mountains.

The specimens show great variation in characters. The pubescence of different plants may be slight or densely hispid-hirsute, or of any intermediate grade. The leaf is usually cordate, obtuse, but may be ovate-cuneate and acuminate, the outline usually crenate-dentate, may be coarsely crenate or sharply serrate. The inflorescence varies from a corymb of half a dozen peduncles from the axils of the upper leaves to one of 15 or more heads on branched peduncles. From the characters of *B. hebecarpoides* it must be a nearly related species. It also somewhat resembles *B. Hartwegi.* No. 1792, *Pringle.*

VIGUIERA DELTOIDEA Gray, var. **Tastensis.** Leaves 6–10 cm. long, 4–8 cm. wide, tomentose beneath; inflorescence more condensed and of larger flowers than that of the type. The pappus is very variable: some plants have only two awns from the angles of the flattened akene, others bear the typical fruit of the species. It is very abundant on the western slope of Sierra El Taste.

ENCELIA RADIANS Brandg., is very abundant in the Sierra de la Trinidad of the Cape Region, where it appears very distinct from *E. farinosa.* The type specimen from San Gregorio is the

only one showing traces of the peculiar whiteness of *E. farinosa*.

Franseria arborescens. Arborescent, 3–5 m. high, canescently pubescent; leaves coriaceous, 15 cm. long, 5–8 cm. wide, on petioles 2–3 cm. long, ovate in outline, serrate, long acuminate, deeply cut into 2–3 coarsely serrate lobes, pubescent beneath, greener and puberulent or hispid above; heads naked paniculate; fertile involucres pubescent, armed with 7–8 stout subulate spines hooked at the tip, 2–3 flowered.

Not uncommon from Santa Gertrudis to Cabo San Lucas. The Santa Gertrudis specimens are more hispid and smaller than those from the south. This plant has been distributed by me as *F. flexuosa*, but by the kindness of Dr. J. M. Greenmann in comparing it with the type, I am enabled to distinguish and describe it.

Sabazia Purpusi. Annual, stems 2–3 dm. high, simple or sometimes branched near the base, sparingly hirsute-pubescent; leaves ovate, acuminate, 1–2 cm. long, serrate, on petioles 2 mm. long or less; inflorescence terminating the stems; peduncles 2-4 cm. long, rarely branched, bearing one or two small bracts; rays white or purple, 1 cm. long; anthers disjoined; chaff of the conical receptacle trifid to the base; scales of the involucre ciliate, ovate-lanceolate, acuminate, 1 cm. long, margins scarious.

Collected by Dr. C. A. Purpus near San Felipe, Cape Region, Feb., 1901.

Porophyllum maritimum. Shrubby at base, 2 dm. high, intricately branched, glaucous, stems striate, branchlets spreading; leaves terete, 2–3 cm. long, acuminate, glands 2–4; heads 1.5 cm. long on peduncles solitary in the axils or terminating the branches, 15–20 flowered; scales of the involucre 5, rounded at the apex, 2 mm. wide, 12 mm. long, with a double line of dark linear glands near the middle, purplish when young, dry and reflexed when the akenes have fallen; flowers ochroleucous.

Common on rocks along the coast between Cabo San Lucas and San José del Cabo, where the glaucous plants are conspicuous on account of their color. It differs from *P. gracile* in having larger salicornia-like leaves, in its intricately branched habit, white ap-

pearance and reflexed involucres. The plant of the Cape Region referred to *P. gracile* grows also along the southern coast and is very different. It is not exactly the plant from Magdalena Bay, the type locality, for it is taller, 2-4 feet, more shrubby and the lower leaves are flatter. The Magdalena Bay plant is about a foot high, the leaves are short and terete and the stems are fastigiate.

Dysodia littoralis. Annual, spreading from the base, glabrous, stems 6–15 cm. long; leaves alternate, fleshy, generally entire, spatulate, 2–5 cm. long, 4–6 mm. wide, in luxuriant forms some leaves have short, broad lobes; glands between the margin and midrib, except when lobes are present, and then they are marginal; peduncles terminal, monocephalous; heads hemispherical, disk 2 cm. in diameter; scales of the involucre obtuse, scarious-margined; scales of the pappus about 20, dissected at apex into 5–10 setæ.

This species is related to *D. anthemidifolia*, a plant growing at Magdalena Bay and northward. It is the southern representative of that showy Dysodia, and is even more handsome. Its habitat is along the coast, on sand drifts, from 15 miles south of Pescadero to Cabo San Lucas. From *D. anthemidifolia* it differs in having broad, entire leaves, instead of narrow, pectinately divided ones, a spreading instead of an erect habit, larger flowers and akenes and longer pappus.

Gochnatia arborescens. Arborescent, sometimes becoming a tree 3–4 m. high and 2–3 dm. in diameter, young growth sparingly tomentose; leaves chartaceous, nearly smooth, ovate, acuminate or obtuse, cuneate at base, larger ones 5 cm. long, 3–4 cm. wide, on petioles 5 mm. long; infloresence crowded at the ends of the branches; heads 2 cm. long, 15–20 flowered; involucre light green, cylindrical; scales in 8–10 series, decreasing gradually in size, the lower ones minute, the larger ones ovate-lanceolate, erose, sparingly ciliate; corolla 12 mm. long, lobes ⅓ as long, recurved, with thickened tips when in bloom; style tips flattened, nearly truncate; pappus bristles numerous, almost equalling the corolla, with some shorter ones intermixed; akenes villous, 5 mm. long.

May 29, 1903.

This tree-composite is abundant in some parts of the Cape Region, especially so about Todos Santos. I have collected it often in unsatisfactory condition, and now Dr. Purpus has sent fine specimens.

Stephanomeria Guadalupensis. Perennial, growing in clumps 3–4 dm. high; leaves densely covered with white wool, especially below, becoming glabrous with age, 15 cm. long, 5 cm. wide, pinnately parted into rounded lobes; flowering stems 3–4 dm. high, striate; bracts woolly; branches of the panicle short; involucre calyculate at base, the scales 7–8 mm. long; heads about 10-flowered; pappus of 10 or more bristles, plumose nearly to the base.

Collected on Guadalupe Island in Sparmann's Cañon, March 26, 1897. The clumps of white leaves growing on the nearly perpendicular dark-colored cliffs are very conspicuous. The only fruiting heads collected were remnants from the preceding season.

DIOSPYROS TEXANA Scheele, var. **Californica.** A small tree 4-6 m. high; leaves 6–7 cm. long, glabrous or pubescent, rounded or cuneate at base, sometimes retuse at apex; fruit 2–3 cm. in diameter.

The native persimmon of the Cape Region of Lower California agrees with *D. Texana* in nearly all respects, differing only in the larger size of the leaves and fruit, and from descriptions of the Texas species, seems to be more arborescent. The leaves are very variable in shape and pubescence.

ROTHROCKIA CORDIFOLIA Gray. This is a common plant of the Cape Region. The lobes of the corona, as well as the appearance of the produced stigma, are very variable. The corona lobes sometimes appear as if joined about their center to the stamen tube or corolla. Below the junction and on the sides the lobes are thick and fleshy with the free edges indistinctly crenate, above they are thinner and the upper edge is sharply 2-toothed near the middle, there are also two lateral teeth more or less developed. In one flower examined some of the corona lobes lacked the thickened, free margin of the base. At the side and base of the lobe, the fleshy free margin often stands out as an auricle. The two new species here described, though evidently nearly re-

lated, differ from one another as much as they do from the type of Rothrockia, and if much stress was put upon the construction of the corona, each could be considered a distinct genus.

Rothrockia umbellata. Stems twining, 1–1.5 m. high, hirsute; leaves opposite, cordate, ovate-acuminate, 4 cm. wide, 7–8 cm. long, on petioles about 4 cm. long, slightly hirsute, lighter-colored on the lower surface; umbels or racemes axillary, 1–6 flowered, peduncles 2–3 cm. long, hirsute, pedicels bracteate at base, 2 cm. long; corolla rotate, 3.5 cm. in diameter, yellowish-green, deeply 5-cleft; lobes ovate-oblong, the upper faces furnished with short whitish corolline processes, except where dextrorsely overlapped by the adjacent lobe in the bud; corona 5-lobed, thick and fleshy, especially about the lower part near the base, furnished with a thickened band that is somewhat free and 2-lobed near its middle, with rounded lateral lobes, and from the sides a caudate process 1.5 mm. long; stigma abruptly produced from the top into a column having a spherical apex; follicle 12–15 cm. long, fusiform, glabrous.

Not uncommon in the Cape Region about the base of the mountains.

Rothrockia fruticosa. Stems woody, twining, 2 m. high, hirsute throughout; leaves cordate, ovate-acuminate, 3 cm. wide, 4 cm. long on petioles about 2 cm. long; flowers solitary or umbellate with pedicels 2 cm. long, bracted at the base; corolla brown-black, deeply 5-cleft; lobes ovate; corona 5-lobed, thick and fleshy, with two teeth at the upper edge near the middle of the lobes, the lateral teeth not well developed, the caudate processes arising from the exterior of the lobe prominent, 4 mm. long, 3–4 times exceeding it, these tails are united by a somewhat membranaceous, crenate-dentate connective, making the lobe somewhat double; stigma produced from the top into a column having a capitate apex that is surrounded by ten globular projections; follicle fusiform, 15 cm. long, glabrous.

Collected near Santa Anita, Cape Region.

PATTALIAS PALMERI Watson. This is a common plant growing near the coast, often in the sand of the shore, from Todos

Santos down to Cabo San Lucas, San José del Cabo, and probably northward along the east to Muleje, where it was first collected by Dr. Palmer. The west coast specimens are more luxuriant plants than the original one and aresometimes six feet high. The flowers are slightly larger and the conical beak is bidentate. Dr. Greenmann writes that the beak of the stigma is inconspicuously bidentate in the type specimens. Dr. Watson describes the flowers as yellow, but the outer side of the petals is lurid-brown, and I have never seen them open wide enough to display the dull yellow interior.

Gilia scabra. Suffrutescent, branching, 4–8 dm. high, glandular-roughened; upper leaves parted to the base into 6–7 linear divisions, lower leaves linear, 2–4 cm. long, cleft into 2–3 pairs of linear-lanceolate lobes 1–2 cm. long, all mucronate; corolla similar to that of *G. floribunda*, 15 mm. long, the tube slightly exceeding the calyx lobes, these 7 mm. long, acuminate, scarious-margined; ovules 4 or more in each cell.

Collected at Santa Rosalia, Lower California, March 4, 1900, by C. R. Orcutt. This Gilia is related to *G. floribunda* and belongs to §. Siphonella, although it differs from the published characters of the section in many particulars.

PHYSALIS GLABRA Benth. *P. hastata* Rydbg. Todos Santos is hardly fifty miles from Cape St. Lucas, where the type of *P. glabra* was collected, and is in the same phytographical region below the Tropic of Cancer. Mr. Bentham describes the leaves of *P. glabra* as being sometimes hastate. Dr. Rydberg has confounded the Cape Region Todos Santos, with Ensenada de Todos Santos near San Diego, Calif. *P. glabra* usually grows with its long zigzag stems supported by bushes or fences, but is sometimes prostrate on the sand, and is not always "glaberrima."

LYCIUM CAROLINIANUM Walt. is common about San José del Cabo, growing in brackish depressions and salt marshes.

Castilleia Guadalupensis. Stems frutescent, and intricately branched, 2–3 dm. high, glabrous, young growth tomentose, leaves narrowly spatulate, 15–18 mm. long, 2–4 mm. wide, tomentose; calyx cleft equally before and behind about one-half its

length; galea as long as the tube, slightly exceeding the calyx; lip short, the teeth half its length.

This species is nearest to *C. foliolosa*, but instead of having herbaceous stems clothed with white tomentum, is a much branched plant having smooth, hard, woody stems, and the leaves are broader and narrowed at the base. Collected by C. A. Anthony in "an almost inaccessible spot on the western cliff" of Guadalupe Island, Sept. 20, 1896. Harry Drent also collected fragments of it from the same island later. Dr. Palmer collected on Guadalupe a Castilleia referred by Dr. Watson to *C. foliolosa*, specimens of which I have not seen.

Galvesia glabrata. A glabrous, leafy perennial, sometimes the young shoots twining in the manner of certain Antirrhinums; leaves opposite or ternate, the nodes 4–8 cm. long, oblong-lanceolate, cuneate at base, 3 cm. long, 6 mm. wide, on petioles 3 mm. long; flowers apparently scarlet, 1–2 from the axils of the leaves; calyx lobes linear-lanceolate, the largest 5 mm. long; corolla 2–3 cm. long, the lower lip 6 mm. wide, throat not closed by the palate; capsule nearly globular, nodding, slightly exceeding the calyx lobes.

This plant is nearest to *G. juncea:* the flowers are nearly the same, differing only in being slightly more bilabiate, with the lower lip a little wider and more densely yellow-bearded, with somewhat longer stamens and larger anthers. The seeds and capsule are almost the same, but the capsule, on account of a curve of the pedicel near the flower, is pendulous. My herbarium specimens of *G. juncea* all show erect pedicels and a living plant from Cedros Island seed bears no pendulous fruit. The most apparent difference is in the leaves.

G. juncea seems almost leafless on the flowering stems, the leaves being so small and the larger leaves upon sterile shoots never equal the ordinary leaves of this new species. The stems of *G. juncea* never show any tendency to twine. No. 476 *Purpus*, San Felipe, Cape Region, 1901.

GALVESIA SPECIOSA Gray, var. **pubescens.** Hirsute-pubescent throughout; leaves orbicular to broadly ovate. On rocks of Cabo San Lucas, Saucito and other localities of the Cape Region.

Specimens from San Clemente Island are hirsute-pubescent at the flowering part of the stems; those from Guadalupe Island are nearly glabrous. The Lower California form is noted in Proc. Cal. Acad., 2nd Ser. III, 225 as No. 712 *G. juncea* (Benth).

CONOBEA INTERMEDIA Gray. *Stemodia polystachya Brandg.* It is found from Comondu to Cape St. Lucas in forms varying much in pubescence, some being nearly glabrous. The plants are much larger than described, often a foot high, much branched and with an indurated root. *Purpus*, 431.

Ipomæa Tastensis. A glabrous, branching, woody vine with stems 10 m. long climbing over bushes and trees, somewhat twining; leaves cordate, long-acuminate, 5–6 cm. wide, 6–8 cm. long, entire or usually furnished with 2–6 deltoid acuminate teeth 2–5 mm. long at the place where would be the auricle of a 3-lobed leaf; petioles slender, curved as if used in climbing, 3–6 cm. long; peduncles solitary, 2–3 cm. long; pedicels thickened upward, striate; corolla white, 10–14 cm. long, with narrow funnel-form tube, the acuminate lobes spreading 8–10 cm.; anthers inserted high in the tube, lanate two-thirds their length; calyx lobes lanceolate, long-acuminate, 2–5 cm. long, the outer two much shorter; capsule nearly sphærical 1.5–2 cm. in diameter, 2-celled; seeds finely pubescent.

The flowers of this Ipomæa are handsomer than those of *I. Bona-Nox*, which they somewhat resemble. It is very abundant on the western slope of Sierra El Taste and the large white flowers are very conspicuous during the early hours of the day.

Ipomæa peninsularis. The slender stems twining, 1–2 cm. long from a tuberous root, retrorsely pubescent; leaves sessile, clasping or on pubescent petioles 5–10 mm. long, cordate, ovate-acuminate, entire or slightly angulate, 4–6 cm. long, 3–4 cm. wide, glabrous or somewhat pubescent, the midrib excurrent, sinus narrow, the lobes often overlapping; peduncles 3–6 cm. long, 1–3 flowered; corolla funnel-form, pale violet, 15 mm. long, spreading 12 mm. wide; sepals ovate, mucronate, 4–5 mm. long, coriaceous with brown margins, glandular-muricate; capsule ovate-conical, acute, 2–3 times longer than the sepals, 2-celled; seeds 4, pubescent especially upon the angles.

It grows upon the western slope of the Cape Region Mts.

Ipomæa scopulorum. Perennial, pubescent throughout; stems 1–2 m. long, prostrate over rocks or climbing among bushes; leaves 5–6 cm. wide, 6–7 cm. long, especially pubescent upon the veins of both faces, cordate or sometimes cuneate at base, ovate, acuminate, entire, on petioles 3–5 cm. long; peduncles about as long as the leaves, 1–4 flowered, pedicels 2–3 cm. long; corolla cream white, 6–8 cm. long, tube narrow funnel-form, lobes mucronate, spreading 6-8 cm.; calyx pubescent, lobes ovate, aristate, coriaceous, 1–5 cm. long, outer ones shorter; stigma indistinctly 2-lobed; capsule broadly ovate, longer than the calyx, pointed with the base of the style that at maturity falls away with a small part of the capsule, which then divides to the base into four 1-seeded valves; seeds 7 mm. long, brown, triangular in cross-section, densely pilose upon the two sharper angles with white hairs 8 mm. long.

Common at lower elevations of the Cape Region, usually amongst rocks, and also collected at Mazatlan, Oct. 8, 1893, in fruit. It bears an abundance of flowers, is grayish in appearance on account of the white pubescence, and the stems are somewhat coarse and stiff for an Ipomæa.

Ipomæa spinulosa. Stems trailing or somewhat twining, glabrous throughout, armed with numerous prickles 4 mm. or less long; leaves 8–9 cm. long, 7–9 cm. wide, broadly cordate, long-acuminate, the midrib excurrent, entire or sometimes 3-lobed, the lobes pointed; peduncles shorter than the leaves, 7–9 cm. long, thickened upward, 1–3 flowered; corolla pale violet, 3 cm. long, funnel-form, spreading 2 cm. wide; stigma 3-lobed; stamens slightly pilose at base; sepals dark brown with lighter margins, becoming coriaceous, ovate, 6 mm. long, the thick midnerve extended into a spine 3–4 mm. long; capsule reflexed, ovate-conical, acute, longer than the calyx, 2-celled, 4-seeded; seeds seeds smooth, 8 mm. long.

The dark brown prickles are sometimes wide and foliaceous. Collected about the western base of the Cape Region in Sept., 1893.

The following is a list of the species of Ipomæa growing in the Cape Region:

Ipomæa Bona-Nox L.
" *Tastensis* Brandg.
" *Quamoclit* L.
" *coccinea* L.
" *hederacea* Jacq.
" *Mexicana* Gray.
" *Pes-capræ* Sweet.
" *acetosæfolia* R. & S.
" *triloba* L.
" *capillacea* (HBK.)
" *costellata* Torr.
" *filipes* Benth.
" *perlonga* Robinson.
" *aurea* Kellogg.
" *peninsularis* Brandg.
" *scopulorum* Brandg.
" *spinulosa* Brandg.

JACQUEMONTIA PALMERI Watson, var. **varians.** Twining stems 1 m. long; leaves cordate, broadly ovate, acute to mucronate, sessile, or with a petiole 3 cm. long; larger peduncles 10 cm. long, 5-flowered, otherwise resembling the type.

The broad, oval leaves, usually sessile or nearly so, and the long, twining stems give to the plant a very different appearance from that of the small upright forms growing without protection of other larger vegetation, The large plants seem to be the result of abundant rains and a shaded place of growth. Common along western slopes of Cape Region Mts., with the form similar to Dr. Palmer's Guaymas specimens.

Bignonia Californica. Stems climbing over trees, in cross-section representing a Maltese cross; leaflets 2, chartaceous, glabrous above, slightly pubescent on veins below, ovate-acuminate, slightly cordate, 3–4 cm. wide, 6–8 cm. long, conspicuously pinnate-veined; petiolules 4–10 mm. long, petioles 1–2 cm. long, more or less pubescent; flowers on one or two axillary peduncles about 5 cm. long that may be branched near the middle so as to be 2–3 flowered; calyx broadly campanulate, 10–15 mm. long and wide, margin undulate; corolla bright yellow, glabrous without, slightly pubescent within, 4–5 cm. long, the lobes spreading 3

cm., tube 5 mm. long; stamens included, anthers divergent; stigma bilabiate; capsule 2–3 dm. long, 15 mm. wide, glabrous, valves when mature indistinctly 1-nerved, seeds 1x3 cm., the wings about 5 mm. long.

The flowers in dried specimens are black. The calyx sometimes is very small, only 4 mm. long on the same peduncle bearing those of the usual size and with no difference in the size of the corolla. Rarely a third leaflet is represented by a tendril and sometimes one of the lateral leaflets also becomes a tendril. The pubescence of the stems and leaves is variable; specimens from San Bernardo, a high elevation representing very pubescent forms.

Cape Region of Baja California, especially abundant in the vicinity of Miraflores. No. 249 *Purpus*, 716 *Brandegee*.

PARMENTIERA EDULIS DC. is cultivated at San José del Cabo for its fruit, that is usually cooked before eating.

LIPPIA BARBATA Brandg. *L. montana* Brandg., is a common bush of the Cape Region.

Tetramerium fruticosum. Frutescent, 1–3 dm. high, the woody stems with light-colored shreddy bark, the younger growth pubescent; ieaves ovate-acuminate, mucronate, slightly pubescent, 2–3 cm. long, including the 5–8 mm. long petiole, 5–10 mm. wide; primary bracts ovate, mucronate, about 1 cm. long, short ciliate, not strongly nerved; bractlets linear-lanceolate, 1 cm. long, sparingly pubescent; calyx divisions narrowly linear-lanceolate; corolla straw color, tube 5 mm. long, the ovate lobes shorter; capsule 7 mm. long, pointed; seeds muricate-scabrous on both faces.

The seeds are much thicker than those of Carlowrightia. Collected at Purisima, Comondu, and throughout the Cape Region. 489 *Purpus*.

Henrya costata Gray, var. **glandulosa**. Very glandular throughout, leaves and bracts short-aristate.

Specimens from Las Durasnillas, Sonora, are slightly glandular and intermediate between the Cape Region Form and Pringle's No. 4634.

JUSTICIA PALMERI Rose. *Beloperone Californica conferta* and *B. hians* Brandg.

Carlowrightia Californica. Frutescent, diffuse, 2–3 dm. high, sparingly pubescent or glabrate; leaves ovate-acuminate, mucronate, 3–5 cm. long, 1–2 cm. wide, on petioles 1–1.5 cm. long; flowers spicate, terminal or on leafless axillary branchlets; bracts linear-lanceolate, 2 mm. long, bractlets minute; calyx deeply 5-cleft, lobes subulate, 2–3 mm. long; lobes of the cream-white corolla 8 mm. long slightly exceeding the tube; filaments glabrous, anthers oblong; capsule 14 mm. long, stipe as long as the body; seeds light colored, 4 mm. in diameter, minutely muriculate, the edges under a lens appearing erose.

Common throughout the southern part of the Peninsula from Comondu to Cape St. Lucas.

Beloperone Purpusi. Tomentose and villous; leaves cordate, ovate, acuminate; villous especially upon the margins and veins beneath, the lower ones 7–8 cm. long, 4–5 cm. wide, on villous petioles 2 cm. long, upper leaves short petioled, becoming gradually cordate-clasping bracts, broader than long, from the axils of which the flowers are produced; calyx villous, 12 mm. long, divided nearly to the base into 5 linear-lanceolate nearly equal divisions, bractlets filiform, 3 mm. long; corolla 3 cm. long, the lower lip 3-lobed; anthers unequally inserted upon a broad connective, the lower one calcarate, the upper sometimes minutely so; the continuation of the stamens below the point of insertion near the base of the corolla densely white hirsute; carpels villous, 2 cm. long, with the stipe like base obtuse; mature seeds, ash-colored, nearly spherical, rugose upon the sides, with a slight central ridge, nearly mature seeds are mottled and the central ridge is prominent.

A comparison with *B Californica*, of the same region, which it somewhat resembles, shows the following differences: the flowers may have been reddish, although some of them have dried to a bright yellow, the calyx lobes are usually longer and the cordate-clasping bracts give a leafy appearance to the inflorescence that the naked flowering stems of *B. Californica* lack. The seeds

are not like the smooth seeds of *B. Californica*, and the large cordate leaves attract attention immediately.

No. 552, *Purpus*, San Felipe, Feb., 1901. Growing in shady cañons.

JUSTICIA INSOLITA Brandg., var. **Tastensis.** Stems hispid-hirsute; leaves larger, hirsute, indistinctly crenate, otherwise resembling the type.

Sierra de la Laguna. No. 511 *Purpus*, El Taste.

The type came from San Gregorio, nearly 200 miles to the north.

Ruellia cordata. A shrub 4–5 cm. high with glandular-pubescent and somewhat viscid leaves and stems; leaves cordate, obtuse, 12–15 mm. wide, 10-12 mm. long on petioles 2–3 mm. long, the upper ones sessile; flowers solitary on stout, straight axillary peduncles 1–2 cm. long; bracts foliaceous, orbicular, broader than long, 6–8 mm. in diameter, nearly sessile; calyx lobes glandular, varying from broadly to narrowly spatulate, obtuse or acute, 10–15 mm. long; corolla light purple, 3–4 cm. long, tube longer than the calyx lobes; stamens didynamous, anthers nearly equal; ovules 8.

No mature fruit collected. Comondu, March 26, 1889.

Tradescantia peninsularis. Stems prostrate, rooting at the lower joints, somewhat zigzag, sparingly pubescent; leaves narrowly ovate-acuminate, 6–7 cm. long, 2 cm. wide, sessile, sheaths tomentose; umbels of 2–3 flowers on pedicels 5–8 mm. long, sessile in most of the axils and terminal, the terminal one often bibracteate; bracts similar to the leaves, the upper ones half smaller; sepals white pilose; petals light purple. filaments equal, pubescent to near the tips; anthers with a deltoid connective as broad above as the cells; ovary very hirsute; capsule 3 mm. long, pilose, 3-celled, cells 2-seeded.

Collected at many localities in the Cape Region and distributed as *T. crassifolia*, from which it seems to be very distinct. It grows under the shade of trees.

Callisia scopulorum. Annual, stems prostrate, 1–2 dm. long, rooting at the joints, glabrous. excepting the ocreæ and upper part of the stem, which are sparingly pubescent; leaves ovate,

sessile, acuminate, of thin, delicate texture, 3 cm. long, 1.5 cm. wide; peduncles axillary 1–6 cm. long, usually umbellately 4–5 flowered, sometimes slightly paniculate; pedicels 8–10 mm. long, bracts at base ovate and small, or larger and leaf-like; sepals, two, 2 mm. long, ovate-lanceolate; petals two, ovate-lanceolate or ligulate, shorter than the sepals, hyaline, ochroleucous with a shade of purple; stamen one; filament glabrous; anther in dried specimens twisted; ovary compressed, glabrous; style shorter than the capsule, penicillate; capsule compressed, 2 mm. long, 2-celled, 2-valved; seeds in each cell, usually 1, sometimes 2, straw-colored, striate.

Common in cañons of the west side of the Cape Region Mountains, growing under the shade of rocks in very damp locations.

NOTES ON PAPAVERACEÆ.

BY T. S. BRANDEGEE.

ROMNEYA COULTERI Harv. & R. TRICHOCALYX Eastwood. Like so many other members of the order this is a very variable plant, even after the segregation of a second species. The two grow together side by side in our garden and certainly appear abundantly distinct. They, however, differ strikingly from the description and figure* given by Miss Eastwood, as the following notes will show. The habit of the plants for instance being reversed.

R. Coulteri: Stems weak and spreading, more branching above, leaves thinner, larger; the lower 7-parted, all the divisions acute, the bract-like leaves under the flower simple and not much farther from the flower than in *R. trichocalyx*. The calyx is smooth, more than an inch long, extended into a cone with free purplish tips and is somewhat persistent, holding the petals upright the first day of expansion. The corolla is twice as large and does not expand with the same regularity, the stamens are very much more numerous, less conspicuously purple at base and the hispid hairs of the fruit are spreading. The convolute ribs of the dehiscent pod described by Miss Eastwood are perhaps

*Proc. Cal. Acad. ser. 3, i. 133-5.

abnormal, at any rate they are straight in our plant of *Coulteri*. The seeds are reticulate-tuberculate, somewhat irregular in shape, and practically the same in both species.

R. trichocalyx forms a compact mass with erect stems, the leaves are thick and more glaucous, divisions fewer and the terminal lobe 3-toothed. The bud is nearly globular, a little depressed on top, rather sparsely covered with appressed hispid bristles, and the peduncular leaves are often few-parted. The capsule is appressed-hispid. *R. trichocalyx* in a much greater degree than *R. Coulteri*, spreads by underground stems which extend 30-40 feet from the parent plant in all directions. Along these stems shoots arise at intervals, often a half dozen together, forming clumps that in time rival the parent. Roots appear to form very slowly and these clumps are often of considerable size before any are found. The shoots even when several feet high are very easily pulled, but the subterranean stem promptly sends up a fresh supply in the same spot.

The plant of *R. trichocalyx* in our garden was installed about three years before *R. Coulteri*. In those years it never matured seeds, but ever since *R. Coulteri* was planted beside it, fruits have matured on the side where they touch. *R. Coulteri* always fruits regularly from every shoot.

ESCHSHOLTZIA CALIFORNICA Cham. About eight years ago a package of seeds labeled *E. maritima** was purchased from a dealer and planted in our garden. Since that time it has been allowed to grow spontaneously, but after the spring flowering the crown is cut off by the hoe, so that it is practically annual. The variations which have appeared are so numerous as to deserve recording. The corolla appears to vary least although the extent of the rhomboidal spot is very uncertain and a form with fringed petals has occurred. The calyptra varies within moderate limits but is in general hardly retuse. The stigmas are rarely more than four, oftener only two, the longer pair alternate with the placentæ. These longer stigmas are usually shorter than the stamens at the flowering, but in one case my attention being attracted to the appearance of a plant in which every flower seemed

*E. L. Greene, Pitt i. 60.

to have a small green leaf in the center, I found on examination that the stigmas were so elongated as to have been caught in the apex of the calyptra, and later diverging at the center had drawn the calyptra down until it rested on the stamens.

The pods are 10-ribbed, curved along the placental lines, and at maturity separate explosively into two lateral valves, scattering the seeds widely in the process. These pods vary perhaps more widely than any other part of the plant; they run from 1½–4 lines in width, from 2–4 inches in length; from elliptic in section to almost round; from rough to smooth; from blunt to long acuminate; from nearly even to prominently ribbed, and from light green to purplish red.

That too much emphasized body, the rim of the torus, runs from rather broad to nearly obsolete.

The foliage, though still whitened, has nearly lost the papular pubescence which distinguished it when first brought from its island home, and occasional individuals are of a glaucous red color. The leaf segments have increased in length and diminished in width, though still quite variable in that respect.

Several years ago an apetalous plant appeared among the others. The calyptra remained on the torus until lifted up by the developing ovary. In this condition herbarium specimens were made, but shortly afterward the plant was destroyed by a careless gardener. It grew on the margin of the lily pond, and perhaps the sodden condition of the soil may have had something to do with the unusual development.

In observing these mutations it was found that though each individual did not vary in its different flowers and fruits it did not transmit its character with any certainty. In the fringed form, for instance, out of an ounce or more of seed from the parent, only one fringed individual appeared.

Two not very well-marked forms of *Platystemon Californicus* have been already described as species. These are *P. leiocarpus* F. & M., which is the glabrous-fruited form common north of San Francisco, and *P. crinitus* Greene, a more southern form. Both of these, founded largely on pubescence, grade insensibly into the

type, but several forms now known show apparently more stable characters, at least the connecting forms are not so common. Two of them were apparently known to Torrey & Gray as early as 1838, and two have been noted and quite fully described, though without names, several years ago.

PLATYSTEMON CALIFORNICUS Benth. var. **capsularis.** Usually prostrate with elongated branches rough-hirsute; leaves broad; capsule of numerous effete coherent carpels, bearing naked seeds. Bluffs of the seashore at San Simeon.*

This is the form which approaches in structure of the fruit to *Platystigma linearis;* the carpels, however, though coherent on the plant are not so in herbarium specimens, the pressure under which they are dried serving to separate them.

Some of the forms which connect with the type have been observed along the railway from Monterey to Castroville. Near the latter place a plant† was collected which had shorter and torulose hispid carpels containing seeds.

Miss Alice Eastwood has collected a form at Bodegas Bay, which has very broad leaves and is nearly glabrous, with glabrous capsule, and a still closer approach to the type is made by No. 665 Baker, a plant collected in the vicinity of Stanford University.

—— —— var. **nutans** a very slender, spreading plant, pubescent to nearly glabrous, with narrow leaves and slender torulose, nodding capsules that in age spread in the shape of the flower of *Campanula rotundifolia.*

This may possibly be the form mentioned by Torrey & Gray as B. *lineare*,‡ but the brief description given applies to many variations. It is the common form about San Diego and on many of the islands off the coast.

—— —— var. **sphærocarpa.** Plants tall, erect, much branched; leaves rather short; fruit about the size of a pea, globular, glabrous and glaucus; stigmas very short.

Colusa Junction§ near the railway station.

---

*Proc. Cal. Acad. ser. 2, i. 24.

†Zoe i. 279.

‡Fl. i. 65.

§Zoe i. 280.

RECENT LITERATURE.

BOTANY OF SOUTHERN CALIFORNIA.—*A check-list of the Flowering Plants, Ferns, Marine Algæ, etc., known to occur in San Diego, Riverside, San Bernardino, Orange and Los Angeles counties, California, and north Baja California, with notes, and descriptions of many species.*—By CHARLES RUSSELL ORCUTT, Editor of the West American Scientist, author of the Cactaceæ, etc. San Diego, 1901.

One occasionally finds local plant lists which, by their naive exhibitions of the ignorance, self-complacency or other foibles of their authors, afford innocent amusement to the reader. Never have we happened upon another list quite so entertaining in this way as the one whose unpretentious title is given above.

It appears to have been printed from a scanty, but varied assortment of worn type, so that the pages present that grotesque mingling of several sorts of intermixed upper and lower case characters occasionally seen in the amateur newspapers printed by children. The pages, by the ingenious device of giving two numbers to each, are made to appear twice as many as they really are, especially as they begin at page 42.

Word-puzzles are scattered freely through the text, and cannot fail to interest those fond of enigmas. We quote as an example this very easy one:

"E syn 363; mb s3t 70. Wp an 5:54. Hm 550. He 91. Fr 672."

Perhaps the best joke of all is the great number of species of Cactus and bulbous plants "known," to Mr. Orcutt, "to occur" in Southern California. Of the cactuses, some are noted as occurring here as "cuttings only"—a most remarkable biological fact. Concerning others, the mysterious statement is made, "None on hand." Perhaps as many as a tenth of the plants listed are not known, to less fortunate collectors, as occurring within some hundreds of miles of this region. But this exuberance is neatly balanced by the omission of a great number which really do grow here.

A novel and pleasing feature of this "Botany" is the occasional report of the market value of certain plants—"30c each; 2 for 50c"—probably the most important character, in the author's estimation, by which species are distinguished. We miss, with surprise, any quotation on cabbage and tomato plants; but this defect, we trust, will be remedied in the "Manual" which, it is understood, the author has in preparation—a publication which, beyond doubt, will be even funnier than the present one, and tend to extend still further, in the same direction, his well-established reputation in botanical circles. S. B. P.